

## Optirep™ System 400 MHz



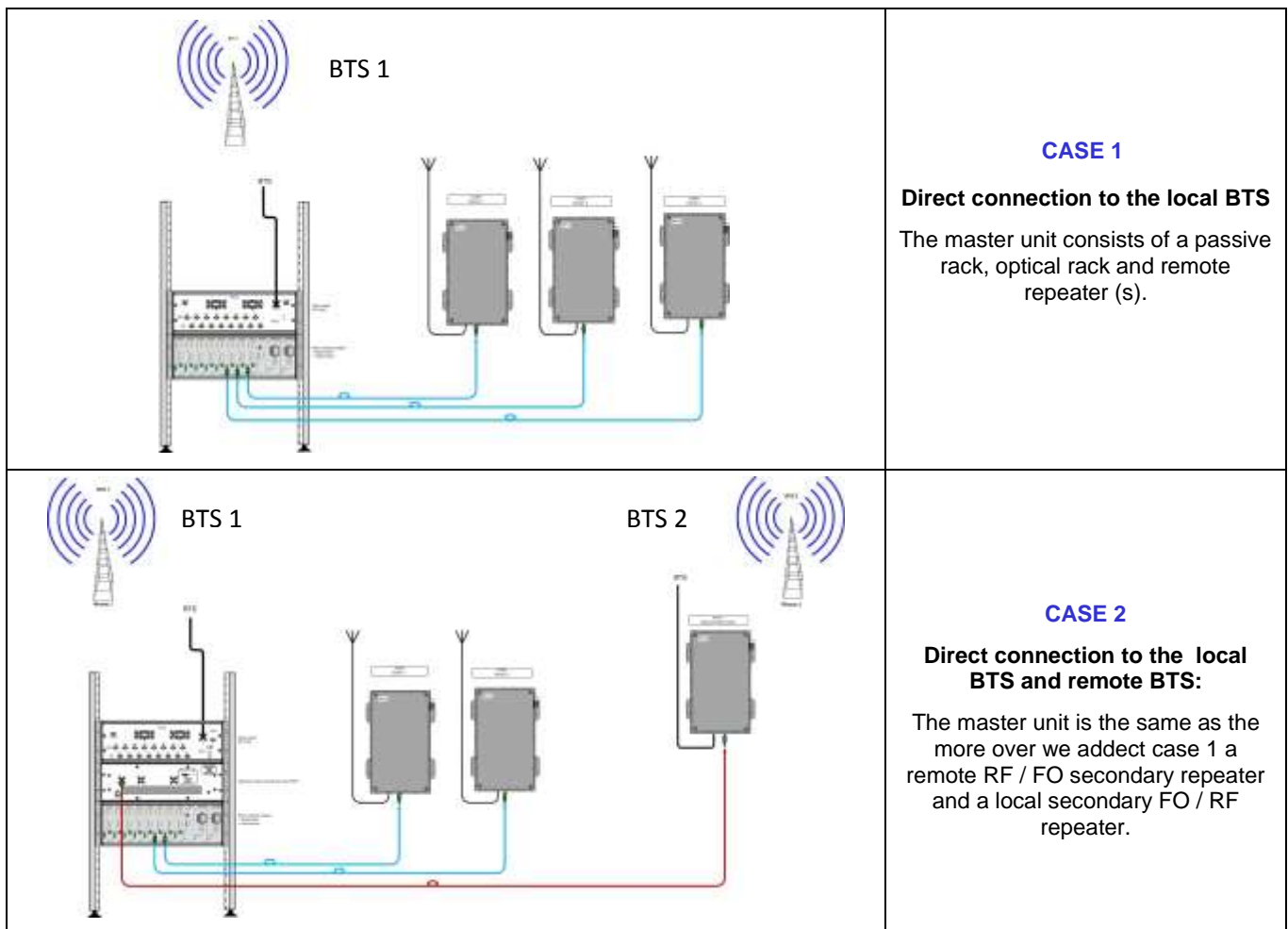
### ❖ General description :

The **OPTIREP™** system is a flexible device that ensures service continuity Tetra / Tetrapol in places or insufficiently covered infrastructure.

The repeater can be monitored remotely thanks to its web server / Integrated SNMP.

The flexibility of the **OPTIREP™ 400 MHz** system allows several combinations according to the specificities of every site.

The signal emitted may come from different sources and therefore present different scenarios:



## Optical Master (Network head)

The optical master can consist of several racks depending on the signal source.

**Local BTS reception :** Use of a passive rack and an optical rack

**Local and remote BTS reception :** The optical master will be identical to that used in a local BTS reception, to which will be added a secondary master repeater.

<b>Racks 3U x19"</b>	<b>Rack 1</b>	Passif rack
	<b>Rack 2</b>	Up to 8 RF / FO transceivers per optical rack (Possibility to triple the optical rack)
		A monitoring module
	<b>Rack 3</b> Réception BTS distante	Up to 2 230 VAC or 48 VDC redundant power supplies (option)
<b>Supply</b>	<b>Voltage</b>	230 VAC or 48 VDC
	<b>Redundancy</b>	One or two redundant power supplies Plug & Play
<b>Cooling system</b>		Forced cooling
❖ <b>Monitoring (option)</b>		
<b>Protocols</b>		HTTP, SNMPv2
<b>Remote monitoring</b>		Modem 2G/3G/4G
❖ <b>OMU 1+ 1 redundancy (option)</b>		Automatic switching in the event of failure of the fiber transmission system



## RF/FO Remote secondary repeater

The remote secondary repeater provides a radio link between a remote BTS and the optical master rack. The use of such a repeater also requires the installation of a local secondary repeater FO / RF



Illustration coffret +36 dBm

INTERFACE RF		UL = +17 dBm	UL = +24 dBm	UL = +36 dBm
Frequency range	Up - Link (RX)		Down - Link (TX)	
	380 - 385 MHz		390 - 395 MHz	
	385 - 390 MHz		395 - 400 MHz	
	410 - 415 MHz		420 - 425 MHz	
	415 - 420 MHz		425 - 430 MHz	
	450 - 455 MHz		460 - 465 MHz	
	455 - 460 MHz		465 - 470 MHz	
Bandwidth		From 1 to 5 MHz SAW filter adjusted Programmable digital filter option		
Gain		50dB to 80dB (Step 0.5dB)	55dB to 85dB (Step 0.5dB)	60dB to 90dB (Step 0.5dB)
Nominal output power	1 Channel	+ 17 dBm	+ 24 dBm	+ 36 dBm
	2 Channels	+ 14 dBm	+ 21 dBm	+ 34 dBm
	4 Channels	+ 11 dBm	+ 18 dBm	+ 31 dBm
	8 Channels	+ 8 dBm	+ 15 dBm	+ 28 dBm
Noise factor		≤ 4 dB @ Gain max		
Ripple in the bandwidth		≤ ± 2 dB		≤ ± 1 dB
Uplink & downlink rejection		> 90dB		> 110dB
UL/DL Isolation		> 40 dBm		> 80 dBm
IP3		< 4 μs		
Delay group		N female 50Ω		
Wavelength	1 repeater per fiber	Standard	Downlink : 1310 nm Uplink : 1550 nm	
	Multiple repeaters per fiber	Rank 1	Downlink : 1310 nm Uplink : 1550 nm	
		Rank 2	Downlink : 1310 nm Uplink : 1510 nm	
		Rank 3	Downlink : 1310 nm Uplink : 1530 nm	
		Rank 4	Downlink : 1310 nm Uplink : 1570 nm	
Optical Output Power		4 dBm ± 2 dB		
Optical connector (in the box)		SCAPC		
Optical fiber		SMF (G652D and G657A2)		
Optical input / output number		1 per repeater (DL + UL on the same fiber) If multiple repeaters per fiber, external optical coupler is available as an option		
Laser type		DFB		
Optical noise level		-137 dBm/Hz		

## Secondary local repeater FO / RF

The local secondary FO / RF repeater is adapted to make the connection between the passive rack with the BTS 2.

INTERFACE RF		DL = +17 dBm	DL = +24 dBm	DL = +36 dBm
Frequency range	Up - Link (RX)		Down - Link (TX)	
	380 - 385 MHz		390 - 395 MHz	
	385 - 390 MHz		395 - 400 MHz	
	410 - 415 MHz		420 - 425 MHz	
	415 - 420 MHz		425 - 430 MHz	
	450 - 455 MHz		460 - 465 MHz	
	455 - 460 MHz		465 - 470 MHz	
Gain		50 dB à 80 dB (Saut de 0.5 dB)	55 dB à 85 dB (Saut de 0.5 dB)	60 dB à 90 dB (Saut de 0.5 dB)
DI composite output power		+ 17 dBm	+ 24 dBm	+ 36 dBm
Noise factor		≤ 4 dB @ Gain max		
Ripple in the bandwidth		≤ ± 2 dB		≤ ± 1 dB
Downlink / uplink rejection		> 90dB		> 110dB
UL/DL isolation		> 40 dBm		> 80 dBm
IP 3		> 40 dBm	> 51 dBm	> 69 dBm
Group delay		< 1 μs		
RF Connector		N female 50Ω		
Wavelength	1 repeater per fiber	Standard	Downlink : 1310 nm Uplink : 1550 nm	
	Multiple repeaters per fiber	Rank 1	Downlink : 1310 nm Uplink : 1550 nm	
		Rank 2	Downlink : 1310 nm Uplink : 1510 nm	
		Rank 3	Downlink : 1310 nm Uplink : 1530 nm	
		Rank 4	Downlink : 1310 nm Uplink : 1570 nm	
Optical Output Power		4 dBm ± 2 dB		
Optical connector		SCAPC		
Optical fiber (in the box)		SMF (G652D and G657A2)		
Number of optical input / output		1 per repeater (DL + UL on the same fiber) If multiple repeaters per fiber, an external optical coupler is available as an option		
Laser type		DFB		
Optical noise level		-137 dBm/Hz		

## Passive rack module

The **passive rack** allows to inject the RF signals through 8 optical slots in the downlink direction (BS to MS) and to catch the RF signals coming from 1 to 8 optical slot in the uplink direction (MS to BS).

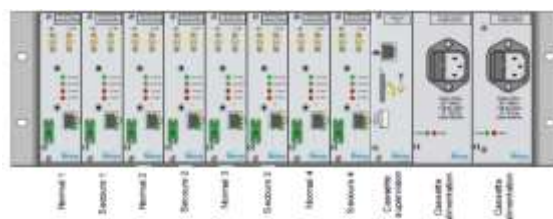
According to the site and the requirements, several versions can be proposed.



✚ RF INTERFACE	
<b>Frequency range</b>	
Broadband	
The optional RIP incorporates a diplexer that attaches the various TETRA / TETRAPOL bands	
<b>Number Input/Output RF</b>	<b>Ou</b>
	<b>BTS access</b>
	<b>RF_RF I/O</b>
	<b>Output</b>
<b>Measurement test point (optional)</b>	
<b>RIP access</b>	
<b>Mechanical characteristics</b>	
<b>Dimensions (L x H x D)</b>	
483 (19") x 133 (3U) x 500 mm	
<b>RF connectors</b>	<b>Inputs</b>
	<b>Outputs</b>
	<b>Access test (optional)</b>

## Optical rack

The **optical rack master** is equipped with 8 optical slots, a monitoring module, and two power supplies in parallel each able to power the complete rack. A backplane bus distributes the power supplies and the RS485 links (global system control) to each cassette.

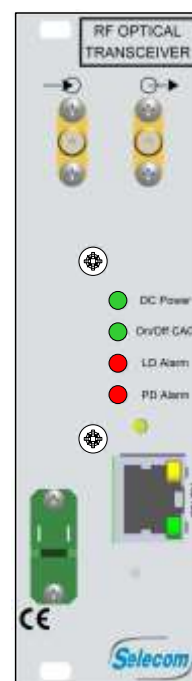


✚ Mechanical characteristics	
<b>Dimensions</b>	Rack 19" - 3U - prof.290mm
<b>Weight</b>	3.500 kg

## RF/FO Transceiver

The **RF / FO transceiver** is an optical transmitter that converts RF input signals into optical signals and transmits them via FO to remote FO / RF repeaters.

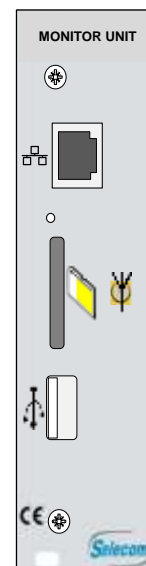
<b>RF Characteristics</b>	
<b>Frequency range</b>	300 – 2500 MHz
<b>RF input power</b>	-10 dBm
<b>RF output power</b>	< -15 dBm
<b>VSWR</b>	1.3 : 1
<b>RF connector</b>	QMA female => <i>Quick tool-less connector</i>
<b>Optical interface</b>	
<b>Wavelength</b>	<b>1 repeater per fiber (Star)</b> Downlink : 1310 nm Uplink : 1550 nm
	<b>Several repeaters per fiber (daisy-chain)</b> Uplink: 1310 nm Downlink : 1510, 1530, 1550, 1570 nm
<b>Optical output power</b>	4 dBm ± 2 dB
<b>IP3 output</b>	≥ +30 dBm
<b>Optical connector</b>	E2000 APC
<b>Optical fiber</b>	SMF (G652D et G657A2)
<b>Number of optical outputs</b>	1 per transceiver (DL + UL on the same optical fiber)
<b>Electrical and Mechanical characteristics</b>	
<b>Dimensions (L x H x D)</b>	35 mm x 133 (3U) x 100 mm
<b>Weight</b>	0,486 kg
<b>Energy consumption (For each transceiver module)</b>	6 W
<b>Maintenance</b>	Plug & Play
<b>Monitoring</b>	Centralized to the Monitoring Module via a serial bus link



## Monitoring module

The **Monitoring module** allows the remote access with media using IP (satellite modem ....). All the "centralized" units (FO / RF repeater) are monitored (via optical fiber) by the master sub assembly in which the supervision module (WEB / SNMP server) is located.

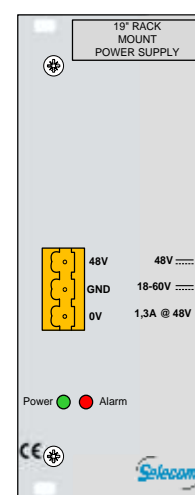
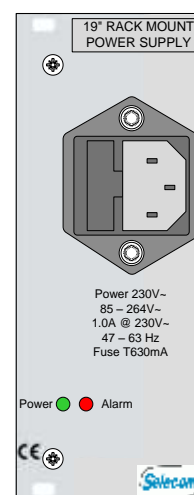
Module characteristics	
<b>Protocols</b>	HTTP, SNMPv2
<b>Remote control</b>	Modem GPRS (GSM) SIM card M2M required
<b>Connectors</b>	RJ45 Slot for SIM card M2M RJ45
<b>Maximum number of optical channels</b>	Can monitor up to 16 pairs of remote receiver / repeater via serial bus
Mechanical and Electrical characteristics	
<b>Dimensions (L x H x D)</b>	35 mm x 133 mm (3U) x 160 mm
<b>Weight</b>	0.524 kg
<b>Power consumption</b>	5 W
<b>Maintenance</b>	Plug & Play



## Energy management module

Integrated in the optical rack, the energy management module is available in 230Vac or 48VDC.

Module characteristics	
<b>Dimensions (L x H x D)</b>	35 mm x 133 mm (3U) x 160 mm
<b>Weight</b>	0.720 kg
<b>Supply</b>	230 VAC ou 48 VDC
<b>Maintenance</b>	Plug & Play



## Optical remote repeaters

Optical remote repeaters distribute the signal to the coverage antennas.



INTERFACE RF		DL = +17 dBm	DL = +24 dBm	DL = +36 dBm
Frequency range	Up - Link (RX)		Down - Link (TX)	
	380 - 385 MHz		390 - 395 MHz	
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	410 - 415 MHz		420 - 425 MHz	
	415 - 420 MHz		425 - 430 MHz	
	450 - 455 MHz		460 - 465 MHz	
455 - 460 MHz		465 - 470 MHz		
Bandwidth		From 1 to 5 MHz SAW filter adjusted Programmable digital filter option		
Gain		50 dB to 80 dB (Step 0.5dB)	55 dB to 85 dB (Step 0.5dB)	60 dB to 90 dB (Step 0.5dB)
DL composite output power		+ 17 dBm	+ 24 dBm	+ 36 dBm
Noise factor		≤ 4 dB @ Gain max		
Ripple in the bandwidth		≤ ± 2 dB		≤ ± 1 dB
Downlink / uplink rejection		> 90dB		> 110dB
UL/DL isolation		> 40 dBm		> 80 dBm
IP 3		> 40 dBm	> 51 dBm	> 69 dBm
Group delay		< 1 μs		
RF connectors		N female 50Ω		
Wavelength	1 repeater per fiber	Standard	Downlink : 1310 nm Uplink : 1550 nm	
	Several repeaters per fiber	Rank 1	Downlink : 1310 nm Uplink : 1550 nm	
		Rank 2	Downlink : 1310 nm Uplink : 1510 nm	
		Rank 3	Downlink : 1310 nm Uplink : 1530 nm	
		Rank 4	Downlink : 1310 nm Uplink : 1570 nm	
Optical output power		4 dBm ± 2 dB		
Optical connector (in the box)		SCAPC		
Optical fiber		SMF (G652D and G657A2)		
Number of optical input/output		1 per repeater (DL + UL on the same fiber) If multiple repeaters per fiber, an external optical coupler is available as an option		
Laser type		DFB		
Optical noise level		-137 dBm/Hz		



## General characteristics

Built in an IP65-compliant box, remote repeaters can be wall mounted indoor or outdoor and in the most challenging environments.

The rack version (3U or 5U) is exclusively for indoor installations so that it can be mechanically integrated into a 19" rack.



Box + 36 dBm



Rack 3 U

<b>Supply voltage</b>		230 Vac or 48 Vdc or 24 Vdc integrated		
<b>Consumption power</b>		<b>+17dBm</b>	<b>+24dBm</b>	<b>+36dBm</b>
		60 W	70 W	100 W
<b>Dimensions (H x P x I)</b>	<b>Box version</b>	550 mm x 140 mm x 350 mm		
	<b>Rack version +17&amp;+24 dBm</b>	3U x 452 mm x19"		
	<b>Rack version +36 dBm</b>	5U x 452 mm x19"/6U x 452 mm x19" (UL/DL)		
<b>Connectors</b>		N_Female		
<b>RAL</b>		9002		
<b>Protection</b>	<b>Box version</b>	IP65		
	<b>Rack version</b>	IP20		
<b>Temperature range</b>	<b>Box version</b>	- 25°C / + 50°C		
	<b>Rack version</b>	0°C / + 45°C		
<b>Cooling system</b>	<b>Box version</b>	Natural convection		
	<b>Rack version</b>	Internal fans		
<b>Monitoring</b>		LAN RJ45 2G/3G/4G Modem Protocol IP, http Web, SNMP Dry loops LED <b>Green</b> and <b>Red</b>		